

A Probiotic-Enhancing Prebiotic

PreforPro[®] supports the growth of beneficial bacteria in the gut through a novel prebiotic that's not fiber or starch-based, and requires a significantly smaller dosage than typical prebiotics.

Prebiotics and Probiotics Defined

The Food and Drug Administration (FDA) defines a prebiotic as “a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon, and thus improves host health.”¹

The FDA defines a probiotic as “a living microorganism which, when administered in adequate amounts, confer health benefits to the host.”² These microorganisms are usually bacteria and are sometimes referred to as “healthy”, “friendly”, “good” or “beneficial” bacteria. Probiotics are microorganisms similar to those that naturally exist in the gut³. The idea is that in order to stay healthy, we must maintain a delicate balance of microflora (i.e. a mix of different bacteria) in the gastrointestinal tract. That balance can easily be upset if unwanted bacterial populations become predominant in the GI tract.

Balancing Bacterial Flora

A proliferation of harmful bacteria in the gut can rob your body of the essential nutrients it needs by consuming those nutrients that your body would normally absorb. Symptoms of unbalanced bacterial flora include⁴:

- Abdominal pain
- Indigestion
- Bloating
- Food allergies
- Malnutrition



In many cases, good bacteria have a difficult time displacing the unwanted bacteria and require help; this is where prebiotics come into play⁵.

Prebiotics: Benefits and Drawbacks

Prebiotics are generally fibers or starches (e.g., oligosaccharides) that have been shown to be beneficial; however these can have some drawbacks⁶, including:

- Large dosages are required to be effective
- They can cause flatulence
- They are sensitive to their specific environment
- They only work in the colon

PreforPro: A New Generation of Prebiotics

As a result of extensive research, the scientists at Deerland Enzymes have developed a novel prebiotic that supports the growth of healthy bacteria in the gut through a mechanism that is not fiber or starch-based. PreforPro addresses the drawbacks of typical prebiotics on the market; benefits include:

- Efficacious in small doses within hours (not days)
- Functions in both the small and large intestines
- Does not cause flatulence
- Not affected by varying gut environments
- Works with a broad spectrum of probiotic species



This novel prebiotic addresses the drawbacks of typical prebiotics on the market.

PreforPro In Action

In-vitro and in-vivo tests have demonstrated the growth-promoting effect of PreforPro on beneficial bacterial strains of *Lactococcus*, *Lactobacillus*, *Bifidobacterium* and *Bacillus subtilis* when competing with undesirable bacterial strains. The effects are achieved at small doses within hours, in both the small and large intestine.

Figures 1 & 2 show the difference in growth rate of beneficial *Bacillus subtilis* and *Lactococcus lactis* bacteria after the introduction of undesirable *E.coli* bacteria.

Figure 1: *B. subtilis* anaerobic growth after 5 hours under physiological conditions, competing with *E. coli*

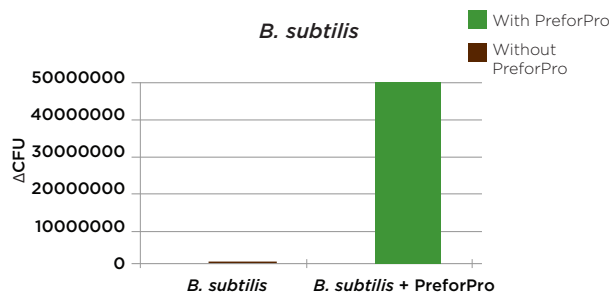


Figure 2: *Lactococcus lactis* anaerobic growth after 5 hours under physiological conditions, competing with *E. coli*

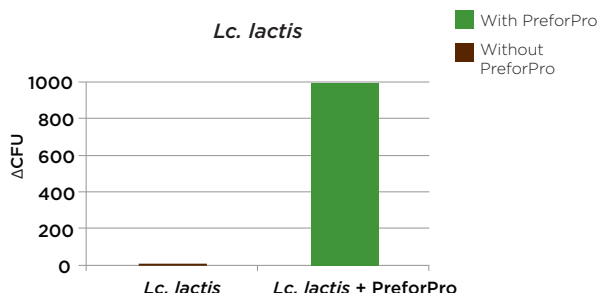


Figure 3: *Bifidobacteria longum* colony counts after 48 hours under physiological conditions when competing with *E. coli*, with the prebiotic inulin compared to PreforPro

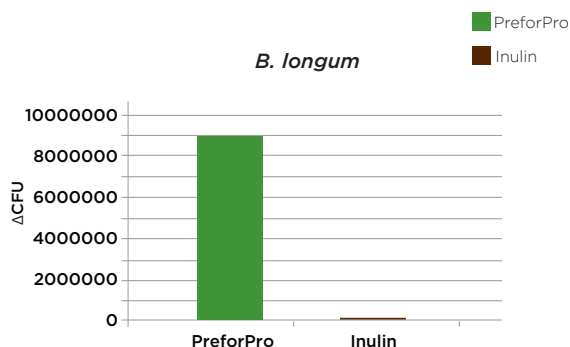
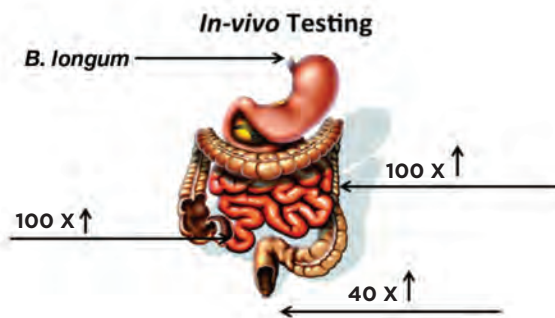


Figure 4: *In-vivo* growth of beneficial bacteria, *B. longum*, when competing with undesirable bacteria, *E.coli*, in different sections of the gastrointestinal tract of mice that were administered PreforPro



Within a 24-hour time period, the subjects with PreforPro showed a 10-fold bacterial growth increase of *B. longum* in the ileum, a 100-fold increase in the large intestine and a 40-fold increase in fecal matter, compared to those with *B. longum* alone.

References:

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2. Fuller, R., "Probiotics in Man and Animals," *Journal of Applied Bacteriology*, 66: 365-378 (1989)
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4. Elphick HL, Elphick DA, Sanders DS. Small bowel bacterial overgrowth. An underrecognized cause of malnutrition in older adults. *Geriatrics*. 2006 Sep;61(9):21-6.
5. Handbook of Prebiotics and Probiotics Ingredients, CRC Press, Boca Raton, FL 2009.
6. Cummings JH, Macfarlane GT, Englyst HN. Prebiotic digestion and fermentation. *Am J Clin Nutr*. 2001 Feb;73(2 Suppl):415S-420S.

These statements have not been evaluated by the FDA. This product is not intended to diagnose, treat, cure, or prevent any disease.



From concept to commercialization, we add value at every step.®



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